



# Investigating Tule Elk

## Post-Visit Activities

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# What Can We Learn From Our Field Journals?



**Students analyze data from their field journals to understand how this type of information is used to make management decisions concerning tule elk. Students will also practice making decisions that affect the tule elk herd within Point Reyes National Seashore through the use of "dilemma" cards.**

Time required: 2 hours

Location: classroom

Suggested group size: entire class

Subjects: science, language arts, math

Concepts covered: decision making and use of information

Written by: Christie Denzel Anastasia, National Park Service

Last updated: 05/30/01

Post-  
Visit

## Lesson Plan

### Student Outcomes

At the end of this activity, the students will be able to:

- Understand the significance of fieldwork results.
- Solve challenges relating to tule elk management.

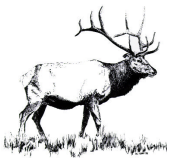
### California Science Standard Links (grades 6-8)

This activity is linked to the California Science Standards in the following areas:

- |           |   |
|-----------|---|
| 6th grade | 5b - organisms and the physical environment   |
|           | 5e - numbers and types of organisms an ecosystem can support depends on the resources available |
|           | 7d - communicate the steps and results from an investigation                                    |
|           | 7e - evidence is consistent with a proposed explanation   |
| 7th grade | 7c - communicate logical connections  |
|           | 7e - communjcate the steps and results from an investigation                                    |
| 8th grade | 9b - evaluate the accuracy and reproducibility of data  |

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## National Science Standard Links (grades 5-8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard A - Use appropriate tools and techniques to gather, analyze, and interpret data; think critically and logically to make the relationship between evidence and explanations; recognize and analyze alternative explanations and predictions; communicate scientific procedures and explanations; use mathematics in all aspects of scientific inquiry; understandings about science and technology.
- Content Standard C - Populations and ecosystems.

## Materials

To be photocopied from this guide:

- **Tule Elk Management Plan Summary** Teacher Information Sheet
- **Dilemma Cards** Activity Sheet (one copy for entire class or one copy per student)

## Procedures

### **1. Review Journals**

As a class, brainstorm a list of all the different types of information collected on the field trip and recorded in the journals. Discuss how all of these different types of information help to accurately portray the complexity of life on Tomales Point. It is important to explain that these types of information would be collected over a long period of time to show variance in season and long-term trends.

### **2. Review Behaviors**

Focus on the **Behavior Survey** field journal sheet by brainstorming a list of all the behaviors observed. Have students compare the behaviors observed to **The Annual Life Cycle of Tule Elk** diagram in the tule elk newspaper. Were their observations consistent with the information on the diagram?

### **3. Review the Tule Elk Management Plan Summary**

Challenge the students to find connections between the information they gathered in the field and how it can help guide management decisions.

Examples:

- Determine a carrying capacity for the elk range and maintain those numbers in dynamic equilibrium with other organisms in the ecosystem.
- In order to determine the carrying capacity, researchers must know how many elk are on the range from year to year, and the condition of the habitat. This would be done through a Population Survey and a Habitat Survey.
- "Research and monitor the habitat and elk population over time." Information gained through a Population Survey, Habitat Survey, and Behavior Survey over time would help managers accomplish this goal.



#### 4. Dilemma Cards

There are eight "Dilemma Card" scenarios on activity sheets following this lesson. Divide the class into several groups and assign the group a dilemma that they must resolve. Allow time for discussion and instruct the students that they will need to present their opinion to the class. As each group presents their scenario allow time for other students to express their opinion. Ask each group: if you could have had more information to base your decision upon, what would you need to know? The answer to this question is what drives scientific research and monitoring. Articulating the questions is one of the most important components of good research design.

#### Extension Ideas

1. Have students produce a journal illustrating their class trip with photos, field journal sheets, maps, drawings, and poems. Show these at a Parent's Night and/or mail copies to Point Reyes National Seashore. We would like to use some of these materials for evaluation and generating further support for our education programs.





## Tule Elk Management Plan Summary

The following information was taken from the Tule Elk Management Plan and Environmental Assessment, 1998:

### Resource Management Plan

- Re-establish a healthy tule elk population on a range which has returned to a natural successional regime as if elk were always present.
- Determine a carrying capacity for the elk range and maintain those numbers in dynamic equilibrium with other organisms in the ecosystem.
- Create and maintain safe visitor observations of wild tule elk by recognizing and minimizing human/elk conflicts.

### Mission

- Adaptively manage elk as a natural component of the dynamic ecosystem of Point Reyes.
- Assist in the preservation of tule elk as a subspecies and the genetic diversity it contains.
- Manage tule elk consistent with other management objectives, including agriculture, public visitation, and the protection of natural, cultural, and recreational resources.

### Management Goals

- Maintain viable populations of tule elk at Point Reyes.
- Manage tule elk using minimal intrusion to regulate population size, where possible, as a part of natural ecosystem processes.
- Provide for a free-ranging tule elk herd in Point Reyes by 2005.
- Research and monitor the habitat and elk population over time.
- Provide the public with interpretation and information on tule elk conservation biology and management.





**Dilemma Cards****Activity Sheet****DILEMMA CARD ONE**

Tule elk have been relocated into a Wilderness Area. Wilderness Areas exclude mechanized equipment and vehicles (except for use in emergencies and threats to life). The best way to begin elk relocation efforts is to use a helicopter. Superintendents of National Park Service areas are allowed to decide on an "minimal tool" to establish a free-ranging herd. As a member of the superintendent's management team, do you...

- allow trucks into the Wilderness Area because the National Seashore already owns trucks that would be cheap to use for relocating elk? Helicopters would be too noisy, expensive, and disturb the herd.
- allow helicopters because they are quick and will have less of a long-term effect overall? The extra cost is worth it.
- not allow any exceptions in a Wilderness Area? Everything will have to be done on foot. This option will take a long time and could impact whether or not relocation efforts will work.
- other

**DILEMMA CARD TWO**

In the recent past, Tomales Point was used for cattle grazing. Water impoundments (artificial ponds) are still present on the Point. Historically, seep-fed springs were the water source, not impoundments. Ideally these impoundments would be removed. However, the California threatened red-legged frog makes these impoundments its home. As an ecosystem manager, do you.....

- remove the impoundments? It is not a natural water source for the tule elk or the California red-legged frog.
- keep the impoundments, but put fences around them to keep the tule elk away and protect the California red-legged frog.
- begin a long-term study that will monitor the effect of these water impoundments on the populations of both species?
- other



**Name** \_\_\_\_\_ **Date** \_\_\_\_\_

Activity Sheet

**Dilemma Cards**

**DILEMMA CARD THREE**

It is the policy of Point Reyes National Seashore to reduce and eliminate non-native species where and when possible. Grazing at Tomales Point has increased nonnative plants such as thistles. The endangered adult Myrtle's silverspot butterfly uses these thistles as a food/nectar source. As the plant biologist at the National Seashore, do you...

- choose the butterfly over the native plant populations by allowing the thistle to grow?
- choose native plant populations over the butterfly and remove the thistle?
- try to strike a balance between the two options until you have further information on all the species, including how the tule elk may or may not impact these two species?
- other

**DILEMMA CARD FOUR**

You are hiking and begin to approach a tule elk herd at Tomales Point. You hear bugling but cannot see the elk. As you hike off-trail to see the elk, you see them running in the opposite direction. Do you...

- try to catch up to the elk to get a better photo?
- stand still and wait for them to move?
- sit down and think about a better way to approach the next herd you may come across on your hike?
- other

**DILEMMA CARD FIVE**

Out on a class trip, you see something white underneath a shrub at Tomales Point. As you get closer, you become very excited because you have found a tule elk antler that was shed several months ago. No one is with you and you could very easily slip it into your backpack. Do you...

- pick up the antler and throw it farther so no one else will be tempted as much as you were?
- take the antler; there must be so many antlers out here, one less antler will not make a difference.
- leave the antler as a source of calcium for rodents?
- other





## Dilemma Cards

### DILEMMA CARD SIX

While eating your lunch at Limantour Beach, a coyote approaches you, eyeing your ham sandwich. Do you...

- share your sandwich since this coyote must be lost from the pack and you can see he looks thin?
- get up and shout as loud as you can, making it clear that at least some humans can be a threat to coyotes?
- accidentally get bit on the hand because you try to pet the coyote?
- Other

### DILEMMA CARD SEVEN

You are a ranch owner. One day while out in your field, you find several animals which no one has seen anywhere in the county for ten years. You decide to...

- set up an enclosure and viewing area, charging visitors \$10 each to see them.
- contact federal and state authorities.
- trap and sell them.
- shoot them, because you believe these animals have been burrowing holes all over your property.

### DILEMMA CARD EIGHT

Tule elk have been reintroduced to a restricted area. Population growth is very high and weather trends indicate several years of drought approaching. As a wildlife manager you...

- decide nutritional pellet supplements need to be bought; Park Rangers will feed the herd until the rains are more regular.
- let nature take its course.
- reduce the population size.
- all of the above
- none of the above
- other



# How Do I Choose and Complete the Best Stewardship Project?



Post-  
Visit

## Lesson Plan

**The final lesson for this unit synthesizes all previous learning experiences. Students have gained an understanding of tule elk, their habitat, and some of the challenges they face as a species. Now it's time to take action by understanding how all of these elements fit together and how we as humans fit into the survival of this species.**

Time required: time varies

Location: classroom, community, or Point Reyes National Seashore

Group size: entire class

Subjects: biology, art, computer skills, community service

Concepts covered: stewardship, educating others, environmental responsibility

Written by: Sarah Davis, National Park Service

Last updated: 12/04/01

### Student Outcomes

At the end of this activity, the students will be able to:

- Synthesize all other pre-visit, on-site, and post-visit lessons from this unit.
- Plan and implement an environmental stewardship activity to benefit the ecosystem they live in and depend upon.

### National Science Standard Links

As a result of this activity, all students in grades 6-8 should develop:

- Content Standard F - Science in Personal and Social Perspectives; Populations, Resources, and Environments.

### Materials

To be provided by the teacher:

- Varies by project, see **Investigating Tule Elk: Environmental Stewardship Projects** Teacher Information

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## Vocabulary stewardship

### Post-Lesson Plan Visit

## Procedures

### 1. **Decide on lesson approach based on time limitations**

Review the teacher resource **Investigating Tule Elk: Environmental Stewardship Projects** following this lesson. This resource explores the range of stewardship projects your class can complete according to time constraints. There are many possibilities ranging from short lessons to more in-depth, interdisciplinary projects that may fulfill educational standards for other subject areas.

### 2. **Prior to any lesson, introduce concept of environmental stewardship**

Begin a discussion of who has responsibilities for natural resources. There are federal agencies such as the National Park Service and United States Forest Service, state agencies such as California Fish and Game, and local organizations. Introduce the concept that organizations such as schools and individuals such as students also have responsibility.

Every day we decide on an individual level what our impact will be on the environment based on our actions. It's usually positive or negative, rarely neutral.

### 3. **Lesson options**

**How Are Decisions Made for Tule Elk** Activity Sheet

**What Is the Future of Large Mammals** Activity Sheet

Create Tools to Educate Others

Implement a Community/School Project

Participate in Volunteer Programs: Point Reyes National Seashore

Support Stewardship Organizations and Be an Advocate for Your Beliefs

(see the teacher resource **Investigating Tule Elk: Environmental Stewardship Projects** following this lesson for more details)



# Investigating Tule Elk

## Environmental Stewardship Projects



### Teacher Information

#### How Are Decisions Made for Tule Elk?

One to two lessons

Students use the **How Are Decisions Made for Tule Elk?** activity sheet to learn more about other deer species found at Point Reyes National Seashore. Based on that research, students devise action plans for the future of tule elk.

#### What is the Future of Large Mammals?

One to two lessons

Students use the **What is the Future of Large Mammals?** activity sheet to learn more about large mammals across the globe. Students will also investigate management concerns for these species and compare/contrast these concerns with tule elk.

#### Create Tools to Educate Others

Arranged in order of possible time commitment, shortest to longest

Lead a class discussion to brainstorm ways students can educate others. Use the list below to help students generate ideas. Once there are a number of ideas, decide which project can be completed within a designated timeframe. Have students create a “plan of action.” What are all the things that need to be done, in what order do they need to be done, who is going to do them, and what are the deadlines? How can students not only teach about the resource, but also impart stewardship values? Remind students to think about any safety issues and address these as a group.

#### **Educational tool ideas:**

- Develop a newsletter or newspaper to distribute to other students.
- Build an exhibit that is displayed for a Parents’ Open House.
- Paint a mural, draw posters, or create a website that encourages coastal stewardship.
- Interview researchers about an elk research project. Share the answers.
- Organize a coastal stewardship contest. Have students define stewardship through writing essays or creating art, poetry or music.
- Videotape your field trip and stewardship activities. Have the students narrate this video and develop a presentation for other students, sharing what they have learned and accomplished.
- Create a mentoring program that enables your students to teach younger students about resources and their stewardship.



## Environmental Stewardship Projects

(continued)

### Implement a Community/School Project

Arranged in order of possible time commitment, shortest to longest

Instruct students to find at least one local environmental issue that is being discussed among community members. Students may gain this information by looking through newspapers, talking to their parents, watching the local news, or listening to a public radio

station. The next day in class, all local environmental issues should be discussed to some extent. Choose one project around which students may design a stewardship project. What are the possible stewardship activities that can be completed by students, and/or their parents, and communities? Follow the ideas in the procedure above to create a plan of action.

#### **Community/School Project Ideas:**

- Work with any local community issues most relevant to your students.
- Practice water conservation at school and home.
- Create a green school: investigate recycling and composting facilities or water conservation. Have students write a plan about how to make your school more environmentally friendly. Have them take action and implement some of their ideas.

### Participate in Volunteer Programs: Point Reyes National Seashore

2-hours, full day, or regular commitment on weekly/monthly basis

Students may participate in programs such as restoration, rehabilitation, or research projects. Consult with the Volunteer Coordinator or Education Specialist for the most recent options, as projects can change according to time of year and staffing availability. One example of participating in a restoration project would be to remove exotic plants from natural areas. To participate in the habitat restoration projects at Point Reyes National Seashore call (415) 464-5195.

### Support Stewardship Organizations and Advocate Your Beliefs

one lesson to lifelong commitment

Introduce students to the concept of advocacy. Have them research and represent the missions of local and national stewardship organizations. Examples include the National Park Service, the Marine Mammal Center, the Humane Society, the Sierra Club, the National Parks and Conservation Association, and the Audubon Society. Have students write letters to their local, state and national government officials regarding stewardship issues or have them submit articles to local newspapers. Encourage students to form educated opinions and to voice them.



## How Are Decisions Made About Tule Elk?



**FIRST**, you must learn about tule elk and other deer found at Point Reyes National Seashore:

Start by reading "Deer at Point Reyes National Seashore" and completing the chart below:

	tule elk	black-tailed deer	axis deer	fallow deer
<b>Origin:</b> Where do these deer come from?	<b>California</b>	<b>central and coastal California</b>	<b>India, Nepal, and Sri Lanka</b>	<b>Southern Europe and Asia Minor</b>
<b>Range:</b> Where are these deer found at Point Reyes National Seashore?	<b>Tomales Point and Limantour area</b>	<b>forests and grasslands</b>	<b>Lighthouse and Chimney Rock areas, and near Marshall Beach</b>	<b>open pastures with oak woodland</b>
<b>Rutting Season:</b> When is the mating season for these elk?	<b>Summer and early Fall</b>	<b>Fall</b>	<b>breed all year</b>	<b>Fall</b>
<b>Distinguishing Characteristics:</b> How can you tell them apart from other deer?	<b>conspicuous dark mane</b>	<b>grayish brown coat</b>	<b>white spots on adult coat</b>	<b>goatlike in appearance, "moose-like" antlers</b>

**SECOND**, you must understand how these deer relate to the environment:

- List two native deer:  
**tule elk, black-tailed deer**
- List two non-native deer:  
**axis deer, fallow deer**
- Define the words below:

Native

**originally belonging to a specific place**

Nonnative

**not originally belonging to a specific place**



## How Are Decisions Made About Tule Elk?

(continued)

- What is being done to control the population of tule elk?  
***immunocontraception program***  
***monitoring of population***
- Is anything being done to control the populations of axis, fallow, or black-tailed deer?  
***monitoring of population***

THIRD, you must use your knowledge and wisdom to make decisions:

*You have just recently been appointed superintendent of Point Reyes National Seashore. Your first major task as superintendent is to develop a management plan for deer species in the Seashore. Think about what you have learned about tule elk and what you observed on your visit to the Tule Elk Reserve. Use that information and experience to answer the questions below.*

- List three challenges facing species of deer in the National Seashore:  
***Non-native deer may be competing with natives.***  
***Tule elk at Tomales Point<sup>5</sup> may have a limited habitat.***  
***Non-native populations could dramatically increase.***

Decide which of the challenges you listed above is the most important, the second most important, and finally the third most important. Place the numbers "1," "2," and "3" next to your challenges in the boxes above.

- What are your reasons for choosing "1" as the most important?
- Focus on the challenge you decided was the most important, brainstorm three solutions that would make the situation better.

**Congratulations, you have created your first plan of action to make Point Reyes Seashore a better place!**

Name \_\_\_\_\_ Date \_\_\_\_\_



## How Are Decisions Made About Tule Elk?

**FIRST**, you must learn about tule elk and other deer found at Point Reyes National Seashore:

Start by reading "Deer at Point Reyes National Seashore" and completing the chart below:

	tule elk	black-tailed deer	axis deer	fallow deer
<b>Origin:</b> Where do these deer come from?				
<b>Range:</b> Where are these deer found at Point Reyes National Seashore?				
<b>Rutting Season:</b> When is the mating season for these elk?				
<b>Distinguishing Characteristics:</b> How can you tell them apart from other deer?				

Activity Sheet

**SECOND**, you must understand how these deer relate to the environment:

- List two native deer:

\_\_\_\_\_

- List two non-native deer"

\_\_\_\_\_

- Define the words below:

Native \_\_\_\_\_

\_\_\_\_\_

Non-native \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_ Date \_\_\_\_\_

## How Are Decisions Made About Tule Elk? (continued)

### Activity Sheet

- What is being done to control the population of tule elk?
- Is anything being done to control the populations of axis, fallow, or black-tailed deer?

**THIRD**, you must use your knowledge and wisdom to make decisions:

*You have just recently been appointed superintendent of Point Reyes National Seashore. Your first major task as superintendent is to develop a management plan for deer species in the Seashore. Think about what you have learned about tule elk and what you observed on your visit to the Tule Elk Reserve. Use that information and experience to answer the questions below.*

- List three challenges facing species of deer in the National Seashore:

☐

 \_\_\_\_\_  

☐

 \_\_\_\_\_  

☐

 \_\_\_\_\_

Decide which of the challenges you listed above is the most important, the second most important, and finally the third most important. Place the numbers "1," "2," and "3" next to your challenges in the boxes above.

- What are your reasons for choosing "1" as the most important?
- Focus on the challenge you decided was the most important, brainstorm three solutions that would make the situation better.

**Congratulations, you have created your first plan of action to make Point Reyes Seashore a better place!**



## Deer at Point Reyes National Seashore

Four species of deer are found at Point Reyes National Seashore. Two of these species, black-tailed deer and tule elk, are native to this area. The two others, fallow and axis deer, are exotic, or nonnative species that were introduced by local residents for hunting purposes in the mid-1940s and 1950s. The National Park Service has a mandate to manage for native species, so Point Reyes National Seashore is currently developing a management plan for all deer species.

### Black-tailed Deer



**Description:** Large ears and a grayish brown coats with forked antlers, with two to five points on each side

**Herd Size:** Varies from a few animals to larger herds of up to 20

**Rutting Season:** Fall

**Native to:** Central and coastal California

**Local Range:** The forests and grasslands of the National Seashore



### Tule Elk



**Description:** A conspicuous dark mane with a tan coat and a distinctive white rump; large, branched antlers of three to six points on either side

**Herd Size:** During the breeding season, males form harems of females of three to fifty animals.

**Rutting Season:** Summer and early fall

**Native to:** California

**Local Range:** Tomales Point Reserve and Limantour area



# Deer at Point Reyes National Seashore

## Axis Deer



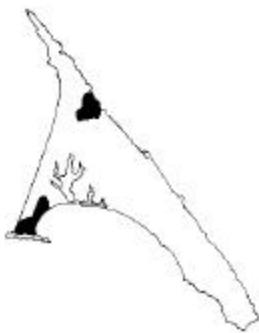
**Description:** Reddish brown coat with white spots along the back and sides; tall, straight antlers that fork at the top

**Herd Size:** Found in herds of up to 150 individuals year round

**Rutting Season:** Breed all year

**Native to:** India, Nepal, and Sri Lanka

**Local Range:** Lighthouse and Chimney Rock areas and near Marshall Beach



## Fallow Deer



**Description:** Goat like in appearance with large palmate “moose like” antlers; one of four different colors including menil (spotted) and white

**Herd Size:** In winter, fallow deer form groups of up to 120 individuals

**Rutting Season:** Fall

**Native to:** Southern Europe and Asia Minor

**Local Range:** Open pastures lined with oak woodland; heavily concentrated in Olema Valley



**Name** \_\_\_\_\_ **Date** \_\_\_\_\_



## What is the Future of Large Mammals

### Activity Sheet

You have studied the tule elk and their management concerns. Now compare them to other large mammals across the world. Choose one mammal from the list below and use a variety of research tools (library, Internet, parents, teachers) to answer the questions below. Keep in mind that large mammals require large habitats and that their future is becoming more difficult as human population increases.

CALIFORNIA:	<input type="checkbox"/> grizzly bear	<input type="checkbox"/> mountain lion	<input type="checkbox"/> wolf
UNITED STATES:	<input type="checkbox"/> bison	<input type="checkbox"/> Florida panther	
INTERNATIONAL:	<input type="checkbox"/> rhinoceros	<input type="checkbox"/> cheetah	<input type="checkbox"/> gorilla

### Natural History

Territory size necessary for each animal:

Habitat:

Lifespan:

Diet (herbivore, carnivore, omnivore):

Predators:

### Management Concerns

Challenges that face this species:

What is being done to help this species survive?

Does this mammal have anything in common with tule elk in terms of its natural history or its management concerns?

